

GONOCARPUS PYCNOSTACHYUS (F. Muell.) Orch. (HALORAGACEAE) REDISCOVERED

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ABSTRACT

Orchard, A.E., *Gonocarpus pycnostachyus* (F. Muell.) Orch. (Haloragaceae) rediscovered. *Muelleria* 8(1): 27–29 (1993). — An ephemeral herb, *Gonocarpus pycnostachyus*, previously known only from its Type, collected near Israelite Bay on the south coast of Western Australia in 1888, has been rediscovered near Mt Heywood and Mt Merivale, north-east of Esperance. An expanded description is provided, the ecology of the species discussed, and its relationships with other species outlined.

INTRODUCTION

Gonocarpus pycnostachyus was described by Ferdinand Mueller (1888) from a plant collected by Miss S. Brooke 'near Israelite Bay' in Western Australia. The original specimen was lodged in the Melbourne herbarium, with a duplicate being sent to Berlin, where it was examined by Schindler in preparing his monograph of the family (Schindler 1905). The Berlin duplicate was subsequently destroyed during World War II.

Subsequent workers (Blackall & Grieve 1965; Orchard 1975; Orchard 1990) have therefore been obliged to base their descriptions of species on just a single specimen, as no further material had come to light in the century following its original collection. While the Type consisted of adequate material to permit a full description, the fact that no additional material was available hampered efforts to elucidate its relationships and distribution. The possibility always existed that this was nothing more than an extreme form of the related taxa from the same general area. The conservation status of the species was also problematical. Briggs & Leigh (1989) rated it as 1K [=Known only from Type; Poorly Known] in their list of rare or threatened Australian plants.

In the early summer of 1991 a bushfire burned a roughly north-south swathe through shrubland to the north-east of Mt Heywood, 85 km north-east of Esperance. This area was visited by Mr William R. Archer of Mt Merivale in late December 1991. He found a species of *Gonocarpus* colonising the newly-burnt area in large numbers. This species has now been confirmed as being *G. pycnostachyus*, and a suite of collections are lodged in herbaria in Hobart, Perth and Melbourne (HO, PERTH, MEL).

These collections provide an insight into the ecology of the species, as well as an indication of variability. *G. pycnostachyus* appears to be a pioneer species, annual or at most a short-lived perennial, appearing after fire. This would partly explain the absence of collections in the last 100 years — the frequency of fires in the shrublands of southern Western Australia is probably lower than was previously the case, and any that do occur are controlled as quickly as possible. Before the fire the vegetation, on deep acid sands, was dominated by dense shrubby Proteaceae, with depauperate shrub understorey and few annuals. After the fire, following a brief period a bare drifting soils, there was an explosion of previously rare or apparently absent herbaceous and small shrubby species. Along with *G. pycnostachyus* there was a proliferation of Poaceae, *Muehlenbeckia* spp., *Gyrostemon dirigynus*, *Gyrostemon racemiger*, *Stackhousia* sp., *Tripterococcus brunonis*, *Alogyne hakeifolia*, *Commersonia crispa*, *Glischrocaryon* spp., *Trachymene anisocarpa*, *Cyphanthera microphylla*, *Solanum simile*, *Solanum capsiciforme* and

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Scaevola (Archer, pers. comm.). In this community *G. pycnostachyus* was very common, whereas before the fire it was apparently absent, and it remained absent from the unburned, dense Proteaceous shrubbery.

The species was subsequently also located on clay/sand loams over granite north-east of Mt Merivale. These plants were growing around a seasonally water-filled rock depression, partly on recently burned ground, partly in areas kept clear of shrubs by the shallowness of the soils and summer drying.

The collections show a fairly wide range of variability in vegetative characters, but are uniform in their flowers and fruits. All plants are in their first year, and all are fertile. They range in size from 11 to 25 cm tall, with arcuately ascending stems arising in a rosette from the crown of a taproot. The numbers of stems varies from 4–6 to about 30, with branching confined to the extreme base. All stems seem to eventually become fertile, with a typical *Gonocarpus*-type indeterminate spike of flowers borne in the axils of reduced leaf-like bracts. Leaf size is also very variable, even on a single plant, apparently depending very much on current growing conditions. As has been noted for other species of *Gonocarpus* (Orchard 1975), many flowers in this species are functionally female, with the petals reduced, and anthers only half their normal size and indehiscent. In this species both fully bisexual and functionally female flowers are found on the same plant, and sometimes even in the same spike. It may be that the abortion of the male parts is a function of growing conditions, with pollen only being produced early in the season when water is presumably more readily available. All collections examined from Mt Heywood were well developed and obviously approaching seasonal maturity.

G. pycnostachyus belongs to a small group of closely related species, including *G. confertifolius*, *G. ephemerus*, *G. nodulosus* and perhaps *G. urceolatus*. All except the last are annual or short-lived perennials of sandy soils in the southern half of Western Australia. They share a fairly coarse indumentum, relatively small ovate to narrowly ovate leaves, and a distinctly urceolate fruit. *G. confertifolius* differs from *G. pycnostachyus* (and from all other species in the group) by its relatively long narrow sepals. *G. ephemerus* is distinct in being the only Western Australian species in the group which lacks a fringe of long hairs on the sepals. *G. nodulosus* is distinguished from all other species in the group, and from all other *Gonocarpus* species, in lacking bracteoles around the flowers. *G. urceolatus* is somewhat anomalous in the group, in being confined to south-eastern Queensland. It has larger leaves than the other species, and like *G. ephemerus* is unusual in lacking the fringing hairs of the sepals, but its urceolate fruits seem to tie it to the group. Whereas the above are the most distinctive features of each species, they also differ in other less obvious characters, like bracteole shape, the size and density of hairs, degree of crowding of the leaves, and indumentum of the fruit.

The expanded description below incorporates the range of variability inherent in all known collections of *G. pycnostachyus*.

DESCRIPTION OF *GONOCARPUS PYCNOSTACHYUS*

Annual herbs 11–25 cm tall; *rootstock* a well-defined taproot, with numerous arcuate-ascending stems arising from its apex. *Stems* mainly unbranched, or sparingly so at the base only, green to reddish, unribbed, with a spreading indumentum of simple hyaline uniseriate 2–3-celled hairs, 0.25–0.8 mm long. *Leaves* opposite at base, soon becoming alternate, with petiole 1.5–3.0 mm long; *lamina* narrowly ovate to ovate, 8–18 mm long, 4–8 mm wide, sessile, midrib and veins weak to obscure, margin white and thickened, with 4–5(-8) short cuspidate teeth 0.5 mm long on each side, semi-appressed indumentum on upper and lower surfaces as for stems. *Inflorescence* an indeterminate spike, with lateral spikes developing freely in the axils of the upper leaves. *Bracts* green, lanceolate to broadly lanceolate, 2.0–5.5 mm long, 0.8–1.7 mm wide, entire, sessile, moderately pilose on abaxial surface with hairs as on the stems, less densely pilose on adaxial surface. *Bracteoles*

red-brown, trifold to multifid, 0.5–0.6 mm long, glabrous or with an occasional marginal hair. *Flowers* solitary in axils of bracts, 4-merous. *Sepals* 4, green, deltoid to narrowly ovate, 0.7–0.8 mm long, 0.4–0.5 mm wide, rather thick, rigidly erect, with a small basal callus, margin with a sparse to moderately dense fringe of hairs which are simple, unicellular and c. 0.1 mm long. *Petals* 4, deep red to green, 1.7–1.8(–2.2) mm long, 0.4–0.6 mm wide (keel to margin), strongly hooded and keeled, with a moderately dense spreading indumentum on dorsal surface, the hairs simple, 1–2-celled, 0.25 mm long. *Stamens* 8; filaments lengthening to 0.8 mm long; anthers deep red-purple, linear-oblong, 1.5–1.8 mm long, non-apiculate (sometimes abortive, yellow, 0.5–0.6 mm long, indehiscent). *Styles* 4, clavate, with bright reddish purple fimbriate stigmas. *Ovary* urceolate, on pedicel 0.4–0.6 mm long, dull reddish purple to silvery grey, neck 8-ribbed vertically, bulbous base with 2–3 horizontal rows of calluses, with a dense very short indumentum. *Fruit* 1-seeded, urceolate, silvery grey, 2.1 mm long (including sepals), 0.8–1.0 mm diameter, neck 8-ribbed, bulbous base 8-ribbed the ribs alternating with 8 vertical rows of 2–3 ± conical verrucosities, body of fruit covered with a dense indumentum up to 0.02 mm long (ribs opposite sepals sometimes glabrous, smooth, shiny); sepals persistent, dark greenish purple, erect to slightly spreading, with a marginal fringe of hairs, otherwise glabrous; pericarp membranous.

REFERENCES

- Blackall, W.E. & Grieve, B.J. (1965). 'How to Know Western Australian Wildflowers'. (University of Western Australia Press: Nedlands.), Part 3, p. 465.
- Briggs, J.D. & Leigh, J.H. (1989). 'Rare or Threatened Australian Plants 1988 revised edition'. (Special publication no. 14 Aust. Natl. Parks & Wildlife Serv.: Canberra.), p. 49.
- Mueller, F. von (1888). Remarks on a new Victorian *Haloragis*, and on the occurrence of the genus *Pluchea* within the Victorian Territory. *Trans. Proc. R. Soc. Vict.* 24: 132–137.
- Orchard, A.E. (1975). Taxonomic revisions in the family Haloragaceae. I. The genera *Haloragis*, *Haloragodendron*, *Glischrocaryon*, *Meziella* and *Gonocarpus*. *Bull. Auckl. Inst. & Mus.* 10: 1–299.
- Orchard, A.E. (1990). Haloragaceae, In A.S. George (Ed.), 'Flora of Australia' (Australia Government Printing Service: Canberra.), Vol. 18: pp. 5–85.
- Schindler, A.K. (1905). Halorrhagaceae, In H.G.A. Engler, 'Das Pflanzenreich' 23: 1–133.